Effect of Intrathecal Magnesium Sulphate on Spinal Anaesthesia at Korle-Bu

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Background & Objectives

Spinal anaesthesia is the preferred technique for caesarean delivery, but the use of intrathecal opioids as adjuvants is limited by adverse effects.

Magnesium sulphate ($MgSO_4$) has been proposed as a non-opioid alternative to prolong spinal block analgesia with minimal side effects.

To assess the impact of incremental intrathecal $MgSO_4$ doses combined with 0.5% heavy bupivacaine on block characteristics and postoperative analgesia in caesarean section.

Methodology

Methods: In this randomized, double-blind trial, 108 parturients undergoing elective caesarean delivery under spinal anaesthesia were allocated to five

groups. Group A received bupivacaine plus saline (control), while Groups B–E received bupivacaine with 50, 75, 100, or 125 mg $MgSO_4$. Primary outcomes were onset and duration of sensory and motor block, duration of analgesia, 24-hour opioid use, and adverse events. Cerebrospinal fluid (CSF) magnesium was also measured. A one-way ANOVA assessed group differences in sensory and motor onset times, block durations, analgesia duration, and 24-hour pethidine use. Significant findings were further explored with Tukey post-hoc tests. Postoperative pain scores, analysed longitudinally, were compared using repeated-measures ANOVA with Bonferroni-adjusted post-hoc analyses where required. Data were analysed with SPSS v25; significance was set at $p < 0.05$.

Results: The demographic and clinical characteristics of the five study groups were comparable.

Table 1: Sensory, Motor and Analgesia characteristics of the study groups

Variable	Groups (mean+/- SD)					
	A	B	C	D	E	p-value
Sensory block onset time (minutes)	2.33 ± 0.86	2.25 ± 0.60	2.23 ± 0.87	1.87 ± 0.76	2.73 ± 1.39	0.062
Sensory block duration(minutes)	123.05 ± 37.13	106.34 ± 28.64	127.73 ± 27.93	116.09 ± 25.72	115.91 ± 23.64	0.162
Motor block onset time (minutes)	3.67 ± 1.35	3.15 ± 1.09	3.09 ± 0.87	2.61 ± 0.89	3.50 ± 1.37	0.025*
Motor block duration(minutes)	125.71 ± 41.30	111.00 ± 27.70	131.82 ± 23.43	126.52 ± 20.80	121.82 ± 17.90	0.156
Durations of analgesia(minutes)	177.19 ± 92.05	186.80 ± 95.48	192.59 ± 104.61	206.35 ± 61.48	119.90 ± 44.55	0.005**
Amount of pethidine consumed 24-hours post-operative(mg)	150.81±31.62	121.25±42.36	144.32±52.28	147.83±64.36	160.23±70.14	0.226

*Motor block onset was shortest with 100 mg $MgSO_4$ vs Control($p = 0.003$) but delayed at 125 mg $MgSO_4$ vs 100mg $MgSO_4$($p = 0.010$)

**Analgesia duration increased non-significantly with doses up to 100 mg $MgSO_4$ but was significantly reduced at 125 mg $MgSO_4$: [p= 0.020 Control vs 125mg $MgSO_4$, p= 0.008 50mg $MgSO_4$ vs 125mg $MgSO_4$, p=0.003 75mg $MgSO_4$ vs 125mg $MgSO_4$ p= 0.001 100mg $MgSO_4$ vs 125mg $MgSO_4$]

Baseline CSF magnesium levels were significantly below reference values ($p = 0.001$). Postoperative pain scores were comparable among groups (p=0.073**)**. Adverse events, including hypotension, bradycardia, pruritus, and nausea/vomiting, were similar, but shivering was less frequent with $MgSO_4$ (p= 0.009).

Discussions & Conclusion

Intrathecal $MgSO_4$ up to 100 mg with bupivacaine is safe and may prolong analgesia in caesarean spinal anaesthesia without lowering opioid needs. Higher doses offer no added benefit and may shorten analgesia.

Reference

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2. Banihashem N, Hasannasab B, Esmaeili A, Hasannasab B. Addition of intrathecal magnesium sulfate to bupivacaine for spinal anesthesia in cesarean section. Anesth Pain Med. 2015;5(3). doi:10.5812/aapm.5(3)2015.22798